IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

IN THE APPLICATION OF: DIANE M. ARTMAN ET AL.

DOCKET NO.: 3226-01 CUSTOMER NUMBER: 26645

SERIAL NO.: 10/554,481 EXAMINER: T. OLADAPO

FILED: OCTOBER 24, 2005 GROUP ART UNIT: 1797

TITLE: DIESEL LUBRICANT LOW IN SULFUR AND PHOSPHORUS

Wickliffe, Ohio

Hon. Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. §1.132

I, Virginia A. Carrick, declare as follows:

I received a Bachelor of Science degree with a major in chemistry in 1986 from John Carroll University. I have been employed by The Lubrizol Corporation since 1987 as a chemist. Since 1992 I have been responsible for formulating lubricants for various engines including stationary gas, heavy duty diesel, passenger car, compressed natural gas, and 4 stroke motorcycle engines. I am one of the inventors in the above-mentioned application, and I am familiar with the references which were used in the rejection thereof.

In order to further illustrate the improvement in performance of the compositions of the above invention, the following experiments were performed under my direction:

A series of lubricant formulations were prepared according to the teachings of the Nakazato et al. reference, JP 2002-053888 (English language machine translation), replicating as nearly as possible Example 10 thereof. In particular, each formulation contained a set of common lubricant additives typical of an engine lubricant. These are set forth in the table, below. Additionally, each lubricant formulation contained either 0.5% by weight of an auxiliary antioxidant/antiwear agent as disclosed in paragraph 0039 of Nakazato: either oleyl amide (a comparative material) or a sulfurized 4-carbobutoxy cyclohexene (a material within the scope of the present claims, component (b). Additionally, the same comparison was made in either low ash (0.56% sulfated ash) or high ash (1.04 or 1.06%) formulations.

Each lubricant formulation was subjected to an HFRR Ramp Wear test, as described in my previous Declaration submitted July 12, 2010. As before, results are reported as wear scar diameter on the ball, μm. Lower numbers are better. Formulations and wear results are shown in the following table.

Components (wt. %) and Results	9*	10*	11*	12
Base oils	Balance, to total 100%			
Conventional additive components:				
Viscosity modifier (ethylene copolymer, incl. 91% oil)	2	2	2	2
Pour point depressant (polymer, esterified, incl. 60% oil)	0.3	0.3	0.3	0.3
Succinimide dispersant (incl. 30% oil)	7	7	7	7
Zinc dialkyldithiophosphate (incl. 9% oil)	0.3	0.3	0.3	0..3
Antioxidants	1.4	1.4	1.4	1.4
Commercial Mo compound	0.054	0.054	0.054	0.054
Oleyl amide	**0.5**		**0.5**	
Sulfurized olefin (S'd carbobutoxy cyclohexene)		**0.5**		**0.5**
Overbased calcium salicylate detergents (45 % oil)	2.0	2.0	4.0	4.0
Sulfated Ash (%, ASTM D 874)	**0.56**	**0.56**	**1.04**	**1.06**
HFRR wear scar, μm	155	143	210	**136**

* A comparative or reference example

The results show that, in low ash formulations (0.56 % Sulfated Ash) the results in the HFRR wear test are equivalent. The value using the sulfurized olefin is slightly lower. although the two values may be within experimental error of each other. In high ash formulations, however (1.04 or 10.6%), the wear scar is definitively lower when the sulfurized olefin is used.

I further declare that all statements herein made of my own knowledge are true and all statements herein made on information and belief are believed to be true. I understand that willful false statements and the like are punishable by fine or imprisonment or both (18 U.S.C. 1001) and may jeopardize the validity of the application or any patent issuing thereon.

Virginia A. Carrick

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11/15/10 (date)